



IN THE UNITED STATES PATENT OFFICE

In re Application of:  
Andriessen  
Filed: January 16, 2001

Art Unit 1755

Serial No. 10/050,317

**RECEIVED**

**DEC 08 2003**

**TC 1700**

PREPARATION OF  
ZINC SULFIDE PARTICLES  
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DECLARATION UNDER RULE 132 OF THE PATENT OFFICE RULES OF PRACTICE

I, Hieronymus Andriessen declare as follows:

1. That I obtained a doctorate in chemistry from the University of Leuven in Leuven, Belgium, in 1991.
2. That I am presently employed in the Research Laboratories at Agfa-Gevaert N.V. in Mortsel, Belgium with primary responsibility in the field of printing plate research, but having previously had primary responsibility in the field of thin film inorganic light emitting diode devices.
3. That I am the sole inventor of the invention disclosed in the present application.
4. That I am familiar with the office action of the United States Patent Office dated August 29, 2003 and the references cited therein.
5. That I have had the following experiments carried out under my direct supervision:
  - i) preparation of ZnS:Cu particles using different precipitation techniques including the double jet method disclosed in U.S. patent application serial No. 10/050,317 filed on January 16, 2001 and evaluation of their photoluminescence properties and their electroluminescence properties in the thin film inorganic light emitting diode device configuration disclosed in U.S. patent application serial No. 10/050,317 filed on January 16, 2001;
  - ii) preparation of ZnS:Mn particles using the double jet method disclosed in U.S. patent application serial No. 10/050,317 filed on January 16, 2001 and evaluation of their photoluminescence properties;
  - iii) preparation of ZnS particles doped with Cu(II) acetate with EDTA in the presence of chloride ions, doped with CuCl<sub>2</sub> in the presence of EDTA, doped with CuCl in the presence of acetate ions and EDTA and doped with CuCl in the presence of EDTA. using the double jet method disclosed in U.S. patent application serial No. 10/050,317 filed on January 16, 2001 and evaluation of their electroluminescence properties in the thin film inorganic light emitting diode device configuration disclosed in U.S. patent application serial No. 10/050,317 filed on January 16, 2001;
6. That I conclude from these experiments that ZnS:Cu particles prepared using different precipitation techniques exhibit vastly different photo- and electro-luminescences depending upon the precipitation technique used.

7. That I also conclude from these experiments that the ZnS:Mn particles prepared using the double jet method disclosed in U.S. patent application serial No. 10/050,317 filed on January 16, 2001 exhibit photoluminescence with  $\lambda_{\text{max}}$  of 595 nm and emit in the wavelength range of 525 nm to above 700 nm i.e. significantly shifted with respect to the ZnS:Mn particles prepared according to the process of Gray et al.

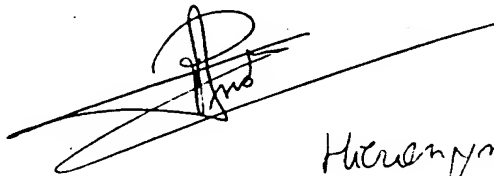
8. That I also conclude from these experiments that the Cu(I) source used to form an EDTA complex of Cu(I) has a significant effect on the electroluminescence observed, its having a shorter lifetime with both poly(vinyl pyrrolidone) and PEDOT/PSS as binders and also a considerably higher brightness with PEDOT/PSS as binder.

9. That I also conclude from these experiments that the Cu(II) source used to form an EDTA complex of Cu(II) has a significant effect on the electroluminescence observed, its having a longer lifetime with both poly(vinyl pyrrolidone) and PEDOT/PSS as binders and also a considerably lower brightness with PEDOT/PSS as binder.

10. That all statements made herein are to my knowledge true and that these statements were made with the knowledge that wilful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of the Title 18 of the United States Code, and that wilful false statements may jeopardize the validity of any United States Patent issuing on the present Application.

Hieronymus Andriessen

Date: November 24, 2003.

A handwritten signature in black ink, appearing to be 'H. Andriessen', written over a horizontal line.

Hieronymus Andriessen